Prevalence, Immediate Maternal Complications and Factors Associated with Thrombocytopenia among Women Delivering at Kampala International University Teaching Hospital, Western Uganda

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Declaration

I, Dr. David Ruiru Gichungu, hereby declare that this research dissertation titled **"Prevalence, immediate maternal complications and factors associated with thrombocytopenia among women delivering at Kampala International Teaching Hospital"** is original and has not been submitted to any other institution for any academic award other than the one it is being submitted for. Where secondary sources of information have been used, they have been duly acknowledged.

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Approval

I have supervised Dr.David Ruiru Gichungu in the process of developing this research dissertation titled "**Prevalence, immediate maternal complications and factors associated with thrombocytopenia among women delivering at Kampala International University Teaching Hospital, Western Uganda**" and I have approved this work to be forwarded to the next level.

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Dedication

I dedicate this book to my mother Dr. Alice Wambui Gichungu and to my Father Dr. George Nganga Gichungu for their endless love, sacrifice, prayers support and advice. I also dedicate this book to all women who may be assisted by the findings of this study.

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I sincerely thank God for giving me the guidance, strength and wisdom not only in doing this postgraduate program but also in all my endeavors. I also wish to express my gratitude to the Department of Obstetrics and Gynecology and to the Board of Postgraduate studies of Kampala International University Teaching Hospital for selecting me to pursue the master's degree in the field of my interest. I am ever indebted to all the Consultants, Lecturers, Senior house officers, Interns and Midwives in the Department of Obstetrics and Gynecology for their guidance, mentoring and support during my MMED training.

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List of Abbreviations

ACOG	American College of Obstetricians and Gynecologists
ADP	Adenosine diphosphate
APH	Antepartum Hemorrhage
CBC	Complete Blood Count
Hb	Haemoglobin
HDU	High Dependence Unit
HELLP	Hemolysis Elevated Liver enzymes and Low platelets
HIV	Human Immunodeficiency Virus
HTN	Hypertension
ICU	Intensive Care Unit
IgG	Immunoglobulin G
KIU TH	Kampala International University Teaching Hospital
KIU-REC	Kampala International University Research Ethics Committee
KIU-WC	Kampala International University- Western Campus
PPH	Postpartum Hemorrhage
RCOG	Royal College of Obstetricians and Gynecologists
WHO	World Health Organization

Operational definitions

Antepartum haemorrhage;- Defined as bleeding from or into the genital tract after the 28th week of pregnancy but before the birth of the baby (the first and second stage of labour are thus included) (DUTTA , 2013).

Emancipated minor; - A person who assumes adult responsibility before reaching the age of 18 years. She is not to be under parents' or guardians care and control, has an income and is considered legally.competent to make decisions concerning themselves.

Immediate maternal complications: – Refers to complications that occur during labour and the first 24 hours following delivery. Immediate complication during labour is antepartum haemorrhage. Immediate complications after delivery are immediate postpartum haemorrhage, haematoma at incision site, haematoma at episiotomy site and disseminated intravascular coagulation.

Immediate postpartum haemorrhage:- Postpartum haemorrhage occurring in the first 24 hours after delivery (ACOG, 2014).

Labour: - Refers to presence of uterine contractions, increasing in frequency and intensity associated with cervical effacement and dilatation with descent of the presenting part (ACOG, 2014).

Postpartum haemorrhage:- Blood loss from the uterus, cervix, vagina and perineum in which there is more than 500mls of blood loss following vaginal delivery or 1000mls of blood loss following caesarean section, after delivery of the baby up to the end of peuperium or any bleeding that will cause hemodynamic instability (Cunningham et al.,2014).

Severity of thrombocytopenia in pregnancy: - Classified as mild when platelet concentration is <150,000/ml to > 100,000/ml, moderate when platelet levels are $\leq$100,000/ml to >50,000/ml and severe when platelet levels are $\leq$50,000/ml (Mccrae, 2010).

Thrombocytopenia: - Platelet count of less than 150,000/ml (Mccrae, 2010).

Multiple blood transfusions: - women transfused four or more time on different admissions.

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Chapter One: Introduction

1.1 Background of the study

1.1.1 Historical background

Thrombocytes were discovered by Giulio Bizzozero in 1882 and rediscovered in the 1960s after many decades of oblivion (Giovanni de Gaetano, 2001). Platelets were initially thought to be associated with thrombosis than hemostasis and also thought to be a dangerous cell that needed to be inhibited by drugs (Mazzarello & Calligaro, 2001). During 1960's, interest of many scientists on clotting cascades elaborated the role of thrombocytes in the hemostasis mechanism (Giovanni de Gaetano, 2001).

In 1735, German physician, Paul Gottleb Werlholf, was the first to describe a disorder with symptoms of thrombocytopenia in two girls who presented with purpura and epistasis and who had spontaneous remission (Liebman, 2008). Brohm and Kraus in 1883 were among the first physicians to report the relationship between thrombocytopenia and clinical symptoms described by Paul Werlholf (Liebman, 2008). In 1946, Demeshek and Miller demonstrated the relationship between production of platelets by the megakaryocytes and destruction in the spleen (Liebman, 2008). Harrington and Worth are the two hematologists who in 1951 settled the debate about the mechanism of thrombocytopenia and the relationship of peripheral destruction of platelets versus impaired production (Stasi & Newland, 2011). The dogma thrombocytopenia as a disorder exclusively due to accelerated platelet destruction was challenged by using platelet kinetic studies with indium111–labeled autologous platelets, these investigators found not only evidence of increased platelet clearance, but also impaired platelet production (Liebman, 2008).

In 1977, a case of neonatal intracranial haemorrhage, was reported as a result of perceived birth trauma after vaginal delivery of a thrombocytopenic infant to a mother with severe thrombocytopenia (Vishwekar et al., 2017). This led to the recommendation that women with severe thrombocytopenia be delivered by elective cesarean delivery, however by the late 1980s, cesarean deliveries were restricted for fetuses with known or suspected thrombocytopenia below 50,000 /μL.

1.1.2 Theoretical background

The causes of maternal thrombocytopenia can be due to physiological changes in pregnancy, pregnancy specific or non-pregnancy specific factors (Perepu & Rosenstein, 2013). Expansion of plasma in pregnancy as a result of physiological changes in pregnancy, leads to haemodilution of

platelets (Asrie, 2017). This leads to a reduction of platelet count by 10%, although the total platelet count remains within normal reference range (Asrie, 2017). This decrease is marked in the 3rd trimester (Anita et al., 2016). A decrease in platelets due to physiological changes in pregnancy may also be due to accelerated platelet destruction across the placenta (Asif et al., 2017).

Pregnancy specific related thrombocytopenia includes gestational thrombocytopenia, thrombocytopenia as a result of severe preeclampsia and thrombocytopenia due to complications of acute fatty liver of pregnancy (Anita et al., 2016). Gestational thrombocytopenia accounts for 70 to 80% of cases in pregnancy; its typically characterized by platelet counts above 70* 10^9/L (Mccrae et al., 2010). It commonly occurs in the mid second to third trimester and has no confirmatory test and is usually a diagnosis of exclusion (Natu et al.,2017). The pathogenesis of gestational thrombocytopenia is unknown, however postulated theory include; haemodilution and accelerated platelets clearance (Mccrae et al,. 2010). Usually gestational thrombocytopenia requires no treatment, unless platelets go below 70* 10^9/L and usually resolves six weeks after delivery with no intervention (Begam et al., 2017).

None pregnancy related causes of thrombocytopenia include; primary or secondary immune thrombocytopenic purpura, drug induced thrombocytopenia, type two Von Willebrands disease and congenital thrombocytopenia (Begam et al., 2017). Additionally, systemic disorders that cause thrombocytopenia include, thrombotic thrombocytopenic purpura, systemic lupus erythematosus, antiphospholipid syndrome, infections (HIV, malaria etc.), bone marrow disorders, nutritional deficiency, splenic sequestration (liver diseases, portal vein thrombosis, storage disease, etc.) and thyroid disorders (Begam et al., 2017).

1.1.3 Conceptual background

Thrombocytopenia is a condition characterized by abnormally low levels of thrombocytes, also known as platelets, in blood (Sembulingam, 2012). Platelets are non-nucleated blood cells formed by cellular fragments of megakaryocytes, and they have a critical role in maintaining hemostasis (Guyton, 2018). A patient is known to have thrombocytopenia when the platelets are below 150000/mm^3. A normal adult platelet count ranges from 150000/mm^3 to 450000/mm^3(Longo et al.,2012).

Thrombocytopenia in pregnancy is defined as platelets level below 150000/mm^3 (DUTTA, 2013). Thrombocytopenia in pregnancy is classified according to severity into mild

thrombocytopenia when platelets levels are 150000-100000/mm^3, moderate thrombocytopenia when the platelets levels are 100000- 50000/mm^3 and severe thrombocytopenia when the platelets levels are below 50000/mm^3 (Nisha et al., 2012).

A complete blood count determines the number of blood cells, including platelets, in a sample of blood (Perepu et al., 2013). In adults (this includes pregnant women), normal platelet count is 150,000 to 450,000 platelets per microliter of blood (Thon et al., 2012). If the complete blood count has fewer than 150,000 platelets, it is interpreted as thrombocytopenia (Perepu & Rosenstein, 2013). There are no universally agreed guidelines on safe platelet count but there is a general consensus that platelet count of 50,000/mm^3 or more is safe for vaginal delivery and 100,000/mm^3 for caesarean delivery (Elveđi-gašparović et al., 2016). However there must be availability of platelets concentrate, fresh frozen plasma and or fresh blood for transfusion when conducting the deliveries (Mccrae & Foundation, 2010).

Age has shown to influence thrombocytopenia in pregnancy with most research having a high prevalence of thrombocytopenia in women below 24 year (Asrie et al., 2017; Nisha et al., 2012). Infections like malaria and HIV have been shown to cause thrombocytopenia during the course of their disease, this influences the incidence of thrombocytopenia in pregnancy in areas with a high prevalence of this diseases (Edeghonghon, 2012; Jodkowska, Martynowicz, Kaczmarek-wdowiak, & Mazur, 2015). Infections cause thrombocytopenia by abnormally activating platelets thus increasing their consumption, sequestration of platelets in spleen or by abnormal production of platelets from bone marrow (Sebitloane, 2016).

A study done in China revealed pregnancy induced hypertension to be a main contributing factor of thrombocytopenia among obstetric factors (Wang et al., 2017). Takoeta and colleagues also had pregnancy induced hypertension as one of the main contributing factors to thrombocytopenia in pregnancy (Takoeta, 2007). Thrombocytopenia became worse with severity of pregnancy induced hypertension according to the study done in Cameroon (Takoeta, 2007).

The association of medical factors, like liver disease, renal disease and malnutrition, is quite significant in its contribution to thrombocytopenia in pregnancy. When the medical factors as a cause of thrombocytopenia are excluded, the incidence of thrombocytopenia drops to as low as 5.1% (Begam et al., 2017). Hypertensive disorders account for 21% of thrombocytopenia in pregnancy, and these include pre-eclamsia, eclampsia, Haemolysis, elevated liver enzyme levels, and low platelet level syndrome (Begam et al., 2017). Gestational thrombocytopenia,

which mostly causes mild to moderate thrombocytopenia, usually occurs in the second and the third trimester (Begam et al., 2017).

1.1.4 Contextual background

Globally thrombocytopenia is the second most common haematological disorder after anemia, affecting about 6.6-11.6 % of all pregnancies (Percpu & Rosenstein, 2013). In canada the prevalence of thrombocytopenia is at 7.6% (Natu et al., 2017). In india the prevalence of thrombocytopenia was 8.8% which was within the global prevalence (Nisha et al., 2012). In sub-Saharan Africa, the prevalence of thrombocytopenia in pregnancy is slightly higher at about 15.3% (Edeghonghon et al.,2012) and the major causes of the a high prevalence in Africa is due to malaria in pregnancy (Edeghonghon et al.,2012). In Nigeria, the prevalence of thrombocytopenia in pregnancy is approximatly 13.5%, which is slightly raised above the global prevalence due to increase in cases of malaria in pregnancy (Asrie et al., 2017).

In Eastern Africa, thrombocytopenia in pregnancy was found to be 8.8%, with higher prevalance among pregnant women in rural areas (Asrie et al., 2017). Among pregnant women with thrombocytopenia in pregnancy, 74% had mild thrombocytopenia,15.7% had moderate thrombocytopenia and 10.3% had severe thrombocytopenia (Asrie et al., 2017). In Uganda, one of the common haematological pathology for pregnant women admission in ICU is undiagnosed thrombocytopenia with an incidence of 14.1% (Nakimuli et al., 2016).

At KIU-TH undiagnosed thrombocytopenia in pregnancy has contributed to complications like severe anaemia, preterm labour and antepaterm haemorrhage, with 5 mothers admitted in ICU in the latter half of last year and one maternal mortality according to KIU records 2018. Associated factors including: social demographic factors, medical and obstetric factors, might be responsible for causing thrombocytopenia in pregnancy.

The current antenatal protocal recommends assesment of platelets at the first visit, when a complete blood count is done (UCG, 2016). After the first antenatal visit, screening for thrombocytopenia is not done, unless the patient comes with complications of thrombocytopenia. Implementation of screening method at least each trimester would not only be cost-effective but would also necesitate early treatment, thus preventing infirmity, blood transfusion complications and maternal mortality.

1.2 Problem statement

Globally thrombocytopenia affects about 6.6-11.6 % of all pregnancies (Mccrae, 2010). It is the second most common haematological abnormality during pregnancy; the first being anaemia (Rajasekhar et al., 2013). One of the main concerns for a mother with thrombocytopenia, is postpartum hemorrhage (Elveđi-gašparović et al., 2016). Globally maternal mortality was 216 per 100,000 live births in 2015 (WHO, 2015). The major contributor to maternal mortality being postpartum haemorrhage. In Uganda, maternal mortality rate is 336 per 100,000 live births, the highest contributor to this being postpartum haemorrhage (UBOS & ICF, 2016). Thrombocytopenia causes 9.89% cases of postpartum haemorrhage in developing countries, with a maternal mortality rate of 5.26% (Nisha et al., 2012). A study done on maternal near misses in Mulago and Jinja hospitals indicated that the most common laboratory criteria for admission to intensive care unit and high dependence unit was thrombocytopenia and was predictive of maternal death (Nakimuli et al., 2016).

At KIU-TH undiagnosed thrombocytopenia has contributed to complications like placentae abruption, antepartum haemorrhage and severe anaemia. In the latter half of 2018, five patients were admitted in ICU due to severe thrombocytopenia in pregnancy, where three of the patients were referred, with one maternal death, according to KIU-TH records, 2018. Use of epidural anesthesia is of particular concern in thrombocytopenia, since a small haemorrhage in this area could cause spinal cord compression (Elveđi-gašparović et al., 2016).

At Kampala International University teaching hospital pregnant women undergo routine antenatal care which includes complete blood count in the 1st visit. However there is no follow up on haematological studies except for haemoglobin levels. Consequently we are not able to diagnose thrombocytopenia in pregnancy until complications like postpartum haemorrhage, preterm labour, and placenta abruption ensues.

A study to identify and document the immediate maternal complications and factors associated with thrombocytopenia among women delivering at KIU-TH will help establish the magnitude of this problem and draw a platform for provision of appropriate interventions.

1.3 Purpose of the study

To determine the prevalence, immediate maternal complications and factors associated with thrombocytopenia among women delivering at Kampala International University Teaching Hospital.

1.4 Specific objectives

i. To determine the prevalence of thrombocytopenia among women delivering at KIU-TH.
ii. To determine the relationship between the immediate maternal complications and thrombocytopenia among women delivering at KIU-TH.
iii. To establish the social demographic, obstetrics and medical factors associated with thrombocytopenia among women delivering at KIU-TH.

1.5 Research questions

i. What is the prevalence of thrombocytopenia among women delivering at KIU-TH?
ii. What is the relationship between immediate maternal complications and thrombocytopenia among women delivering at KIU-TH?
iii. What are the social demographic, obstetrics and medical factors associated with thrombocytopenia in pregnancy among women delivering at KIU-TH?

1.6 Justification of the study

The World Health Organization had an aim of reducing maternal mortality rate by 75% by the year 2015. Unfortunately this was not possible in most developing countries (WHO, 2015). Research aimed at reduction in maternal morbidity and mortality will contribute towards achieving this goal.

A study done on maternal near miss at Mulago and Jinja hospitals, showed that 14.1% of the cases admitted in ICU were due to thrombocytopenia (Nakimuli et al., 2016). However, information on prevalence, severity and immediate maternal complications is still limited despite the condition being the second most common haematological condition in pregnancy and its high contribution to maternal morbidity and mortality.

Information obtained by establishing the severity, immediate maternal complications and factors associated with thrombocytopenia in pregnancy will help the health worker to preempt, and be more proactive in identifying and managing women with thrombocytopenia in pregnancy before the onset of complications. This will contribute towards prevention of maternal mortality and morbidity and aid in achieving the third sustainable developmental goal which aims at reducing maternal mortality to below 70 per 100,000 live births (UNDP, 2016).

1.7 Significance of the study

The information obtained from the study will bring awareness on the magnitude of thrombocytopenia in pregnancy and its contribution to maternal morbidity and mortality. This will enlighten the study participants on thrombocytopenia and importance of screening in subsequent pregnancies. The study findings also will raise awareness for early screening, treatment and close monitoring of women in labour with thrombocytopenia for immediate maternal complications in KIU-TH and other health institutions.

The community will also be enlightened about thrombocytopenia in pregnancy, and the importance of early screening to reduce infirmity and maternal mortality. The data obtained from this study will aid the Ministry of Health plan for proper management of thrombocytopenia in pregnancy and its complications. The results of this study will add knowledge and awareness of thrombocytopenia to the study participants, the community and to all health workers including me.

1.8.1 Narrative of conceptual framework

The diagram above shows interaction between the independent, intervening and dependent variables of this study. Women delivering (independent variable) will be investigated for thrombocytopenia and immediate maternal complications (dependent variable). The intervening variables are those which might influence the occurrence of thrombocytopenia and immediate maternal complications.

1.9 Study scope

1.9.1 Content scope

The study assessed prevalence and severity of thrombocytopenia at KIU-TH and immediate maternal complications during the months of May 2019 to August 2019. Immediate maternal complications included complications during labour and the first 24 hour after delivery. Thrombocytopenia was assessed using automated haematology analyzer.

1.9.2 Geographical scope

The study participants were coming from the catchment areas of Kampala International Teaching Hospital such as Bushenyi, Sheema, Rubirizi, Mitooma and other neighboring districts.

1.9.3 Time scope

The study was limited to a period of May 2019 to August 2019. This was adequate time to achieve the study sample size, since there were approximately 40 deliveries a week adding to 200 deliveries in a month at KIU-TH.

Chapter Two: Literature Review

2.0 Introduction

In production of platelets approximately 1000 to 5000 platelets are produced by each megakaryocyte (Thon & Italiano, 2012). Individuals without any pathology regarding blood cells production, an estimated 35,000 to 50,000μ/L of platelets in whole blood are produced per day; in case of increased demand this value can be increased by eight times (Thon & Italiano, 2012).

The life span of platelets in circulation is eight to ten days, after which by programmed apoptosis, they are removed from the circulation by the monocyte –macrophage system (Thon & Italiano, 2012). When normal equilibrium of circulating platelets pool is set, an estimated one third of total platelets mass are stored in the spleen (Thon & Italiano, 2012). In an overview of blood thrombocyte kinetics, thrombocytes are produced in the bone marrow from megakaryocytes (Luu, 2018). Megakaryocytes are derived from more primitive bone marrow precursors. The megakaryocyte generates platelets by cytoplasmic exuviating directly into bone marrow sinusoids (Thon & Italiano, 2012).

2.1 Prevalence of thrombocytopenia in pregnancy

Thrombocytopenia is a common problem during pregnancy which is often underdiagnosed despite being the second most common haematological complication in pregnancy, after anaemia (Perepu & Rosenstein, 2013). It accounts for about 10% of all pregnancy disorders (Perepu & Rosenstein, 2013). In Canada the prevalence of thrombocytopenia was 7.6%, which was lower than the global estimated value (Natu et al., 2017). This was attributed to good follow-up in prenatal and treatment of most medical disorders that contribute to thrombocytopenia in pregnancy, before a woman conceives (Natu et al., 2017).

In most Asian countries, the prevalence varies from 5% to 12%, the higher prevalence being found in areas with high prevalence of Dengue fever (Navanita et al., 2017). A study done in India reported a prevalence of 7.3% in a population based surveillance study, of these 74.7% had mild thrombocytopenia, 17.9 had moderate thrombocytopenia and 7.4% had sever thrombocytopenia (Nisha et al., 2012). Another study done in Pakistan found the prevalence of thrombocytopenia in pregnancy to be 9.4% (Arora et al.,2017). In India a study focusing on risk of thrombocytopenia in pregnant women found that 47% of women with thrombocytopenia had platelet levels below 100,000/μl, it was very unusual for a patient to present with any symptoms

and signs unless the platelet levels were below 50,000/μl or unless the platelet function was also defective (Duletić-Načinovi, 2015)

In Sub-Saharan Africa, a study in Ghana, found the prevalence to be 15.3% (Edeghonghon, 2012). This was higher than the overall global prevalence due to increased cases of malaria in pregnancy during the study (Edeghonghon et al., 2012). In the same study, 76% of pregnant women with thrombocytopenia had mild thrombocytopenia, 20% had moderate thrombocytopenia and 4% had severe thrombocytopenia (Edeghonghon et al., 2012) In Cameroon, the prevalence of thrombocytopenia was found to be 8.9% with 20% of the individuals having prolonged bleeding (Takoeta, 2007).

In East African countries, Ethiopia has a country prevalence of 8.8% ,while some areas such Debra Berhan Referral hospital, having a higher prevalence of 10.2% (Asrie et al., 2017). In the study done in Ethiopia, 62% of women with thrombocytopenia were found to have anaemia; 10.3% had severe thrombocytopenia, 15.7% had moderate thrombocytopenia and 74% had mild thrombocytopenia (Asrie et al., 2017). In Southern Sudan the prevalence of thrombocytopenia was found to be 15% according to research done in medical university of Khartoum (Adam et al., 2012). The high prevalence found in South Sudan was mostly contributed by malaria in pregnancy and poor infrastructure on follow up of women in antenatal care (Adam et al., 2012). A study done in Mulago and Jinja hospital, on maternal near miss showed that more than 90% of patients admitted in ICU had platelet values below 100,000/mm^3 (Nakimuli et al., 2016). Common signs of thrombocytopenia include petechiae, nose bleeding and, more rarely, hematuria and gastrointestinal bleeding (Myers, 2009).

2.2 Immediate maternal complications and their relationship with thrombocytopenia.

Complication due to thrombocytopenia can occur during pregnancy, during labour or after delivery. Complications during labour are antepartum haemorrhage and disseminated intravascular coagulation. Complications after delivery include postpartum haemorrhage, haematoma at episiotomy site, haematoma at incision site and disseminated intravascular coagulation (Arora et al., 2017).

Research done on prevalence of thrombocytopenia and its effect showed that immediate maternal complications were placenta abruption at 9%, episiotomy hematoma at 3.6%, PPH at 6% and incisional site haematoma at 5% (Arora et al., 2017). A prospective study done on thrombocytopenia during pregnancy and immediate maternal complications showed percentage

of abruption placentae as immediate maternal complications to be 9.4%, PPH (5.3%), episiotomy haematoma (2.5%), incisional wound haematoma (1%) and with DIC at 2% (Vishwekar et al., 2017).

Among the most common complications of thrombocytopenia in pregnancy is postpartum haemorrhage (Nisha et al., 2012), which has been defined as blood loss in excess of 500 mL in a vaginal birth and in excess of 1000ml in a cesarean delivery. For clinical purposes, any blood loss that has the potential to produce hemodynamic instability should be considered a PPH (Board, 2018). Postpartum haemorrhage as a result of thrombocytopenia is worse when operative delivery is done (Edeghonghon et al., 2012).

The most common complication that may occur during labour is abruption placentae leading to antepartum haemorrhage and anaemia (Perepu & Rosenstein, 2013). Placenta abruption defined as bleeding from or into the genital tract after the 28th week of pregnancy but before the birth of the baby (Perepu & Rosenstein, 2013). Antepartum haemorrhage during labour can be severe to not only cause fetal death but also maternal mortality (Perepu & Rosenstein, 2013).
A study done in Kasturba medical college reveled that, placenta abruption was more common among study participants with thrombocytopenia and was more prevalent with increase of severity (Mundkur, Nambiar, & Rai, 2018). This research tabled a discussion whether thrombocytopenia could be used as a sign of impeding abruption in severe preeclampsia (Mundkur et al., 2018). According to Parnas and colleague, the odds of having thrombocytopenia was higher among women with thrombocytopenia than in women without thrombocytopenia, this was significant in there study (Parnas, et al., 2006).

A rare complication as a result of thrombocytopenia in pregnancy is disseminated intravascular coagulation which has a high mortality (Wang et al., 2017).A retrospective study, done in USA on, pregnancy and birth outcomes among women with idiopathic thrombocytopenic purpura in pregnancy, showed that, preterm labour, placentae abruption and still births were some of the adverse outcomes associated with thrombocytopenia in pregnancy (Wyszynski et al., 2016)

Other complications attributed to thrombocytopenia include intracranial haemorrhage to the fetus during delivery, neonatal thrombocytopenia that may occur depending on the cause of thrombocytopenia (Puri et al.,2012). Other complications of thrombocytopenia to the mother include high chances of getting postpartum sepsis, haematoma formation at the site of spinal anesthesia which might lead to paralysis (Elveđi-gašparović et al., 2016).

2.3 Social demographic, obstetrics and medical factors associated with thrombocytopenia in pregnancy

Age has been variably associated with thrombocytopenia. In a study done in Gondor university hospital in 2014, North West Ethiopia revealed the highest percentage of thrombocytopenia being in age category 25-29 years, which was 38.7% followed by age category 30-34 years with 14.3%, age category 35-39 with 7.8% and finally age category 15-19 years with 7.4% (Asrie et al., 2017). Most of the women in this study were primigravida who were more predisposed to gestational thrombocytopenia, thus the high prevalence in young age (Mccrae, 2010). A study done in China revealed that women who were above 35 years were more likely to have thrombocytopenia (Wang et al., 2017). This was attributed to the high incidence of pregnancy induced hypertension in this study which was more prevalent to this age (Wang et al., 2017).

Mothers who lived in urban areas had a higher percentage of thrombocytopenia, 99.1% compared to women who lived in rural areas (Asrie et al., 2017). In this study which had two hundred and seventeen participants, majority was above thirty years old and most of them were from urban areas. In the same study most women who were gravid three or higher were more likely to be diagnosed with thrombocytopenia and had a percentage of 38.2 (Asrie et al., 2017).

In a study done in Libya, thrombocytopenia was more prevalent with increase in gestation age (Muspah & Altayri, 2017). Conversely, Nisha and colleagues had a higher incidence of thrombocytopenia in preterm deliveries (Nisha et al., 2012). The former study had a higher prevalence in 3rd trimester as a result of a high prevalence of gestational thrombocytopenia in this study (Muspah & Altayri, 2017), while the later study had a high prevalence of preeclampsia which attributed to high preterm deliveries (Nisha et al., 2012). In a study done in Ethiopia, there was no significant association between parity and thrombocytopenia (Asrie et al., 2017).

Pregnancy induced hypertension has been a main contributor to thrombocytopenia. A study done by Muspah and colleagues revealed that, the odds of having thrombocytopenia was higher among women with pregnancy induced hypertension (Muspah & Altayri, 2017). A study in China also showed a higher odds of getting thrombocytopenia among women with pregnancy induced hypertension than those without pregnancy induced hypertension (Wang et al., 2017). In Cameroon, Takoeta and colleagues showed a strong association of pregnancy induced hypertension and thrombocytopenia with 23.3% of women with thrombocytopenia having history of preeclampsia (Takoeta, 2007). The strong association of hypertension in pregnancy

with thrombocytopenia could have been due to accelerated platelet destruction and abnormal platelet activation (Sultana et al., 2012).

In Sub-Saharan Africa, diseases like malaria and HIV in pregnancy increase the prevalence of thrombocytopenia in pregnancy (Edeghonghon et al., 2012). In a study done in Cameroon, 22% of women with thrombocytopenia had history of malaria in pregnancy (Takoeta, 2007). In Libya, one of the factors associated with thrombocytopenia was malaria in pregnancy with 22.3% of the women with thrombocytopenia having a history of malaria in pregnancy. This could be as a result abnormal activation of platelets during the course of the disease or abnormal immune mediated destruction of platelets. HIV infection was also significantly associated with thrombocytopenia in as study done by Takoeta and colleagues contributing to 21% of women with thrombocytopenia (Takoeta, 2007). A study done in Libya revealed a strong association of HIV infection with thrombocytopenia with 21% of women having thrombocytopenia being HIV infected (Muspah & Altayri, 2017). The contribution of HIV infection to causing thrombocytopenia could be as a result of platelets involvement in immune response, cytopathic effect of antiretroviral regimens and antigen mimicry (Taremwa et al,. 2015).

Anaemia and Folic acid deficiency are also causes that increase prevalence of thrombocytopenia in pregnancy (Edeghonghon et al., 2012). In central Africa the major risk factors associated with thrombocytopenia in pregnancy were reported also to be due to anaemia in pregnancy, 29.8% of women with thrombocytopenia having anaemia in pregnancy (Takoeta, 2007). In a study done in Libya 37.1% of women with thrombocytopenia had anaemia in pregnancy (Muspah & Altayri, 2017). Muspah and Altayri also revealed that platelets level lowered with the severity of thrombocytopenia (Muspah & Altayri, 2017).

The overall incidence of thrombocytopenia in pregnancy is 8%, but when patients with obstetric or medical conditions are excluded, the incidence drops to 5.1% (Rajasekhar et al., 2013). Medical conditions associated with thrombocytopenia are important causes of thrombocytopenia in pregnancy (Duletić-Načinovi, 2015). Examples of these are chronic disease like, hypersplenism, autoimmune diseases like systemic lupus erythematosus and rheumatoid arthritis (Duletić-Načinovi, 2015). Some medications are also associated with thrombocytopenia. These include antibiotics such as ampicillin, penicillin, rifampin; diuretics like thiazides and furosemide and analgesics such as aspirin, acetaminophen and indomethacin (Duletić-Načinovi, 2015). Women on recreational drugs like alcohol and cocaine were also more likely to have thrombocytopenia (Duletić-Načinovi, 2015). In a study done in Liberian women 25.7% of

women with a history of easily bleeding were found to have thrombocytopenia in pregnancy (Muspah & Altayri, 2017). A history of epistasis, intermenstrual bleeding was also strongly associated with thrombocytopenia in Cameroon, in this study 25.6% of women with thrombocytopenia had a history of intermenstrual bleeding (Takoeta, 2007).

Chapter Three: Methodology

3.1 Study Design

This was a cross-sectional study.

3.2 Study site and setting

This study was conducted at Kampala International University Teaching Hospital which is located in Ishaka town in Bushenyi Ishaka Municipality which is in Bushenyi District. The population of Bushenyi-Ishaka Municipality is 41,217 (UBOS, 2014). Ishaka is found approximately 62 kilometers west of Mbarara town and has a population of 16,646 where females are 8,840 (UBOS, 2014). Kampala International University Teaching Hospital has a bed capacity of 700, providing both out-patient and in-patient services.

The study was carried out in the maternity ward of Kampala International University Teaching Hospital. The department has 8 specialists, 28 senior house officers and 14 midwives. The out-patient department has a gynaecology clinic, antenatal clinic, mother and child health clinic and lastly, family planning clinic. The in-patient department which has a bed capacity of 64 patients is divided into, first stage suit, second stage suit, prenatal ward and post natal ward, with a pre-eclamptic side room and two isolated septic rooms. The department also has two functioning theatres, one in maternity ward for elective and emergency cesarean sections only, the other major theatre for elective and emergency gynecological procedures. An average of 200 deliveries is conducted per month in the maternity ward. KIU-TH has a fully equipped laboratory subdivided into haematology, biochemistry and microbiology department. The hospital has a 5 bed ICU which provides care to severe and life-threatening illnesses and injuries, which require constant, close monitoring and support from specialized equipment and medications in order to ensure normal bodily functions.

3.3 Study population

All women delivering at KIU-TH were considered for this study.

3.4 Selection criteria

3.4.1 Inclusion criteria

Women who were admitted at KIU-TH for delivery, who offered written consent. Emancipated minors were also included in the study.

3.4.2 Exclusion criteria

Women who were unconscious or were unable to consent.

3.5 Sample size

3.5.1 Sample size determination

Specific objective 1; The sample size was derived using the formula by Kish and Leslie., (1965). The sample size was calculated using an estimate prevalence of 50% because the prevalence of thrombocytopenia in pregnant women is not known in Uganda.

$[n = (1.96)^2 pq \div d]$

n – Sample size

1.96 – approximate 95% confidence level

p – Estimated number of women with thrombocytopenia in pregnancy=0.5

q – Number of estimated women not having thrombocytopenia in pregnancy i.e. (1-p) = 0.5

d – Absolute precision/margin of error i.e. 5% = 0.05.

$n = 1.96^2 \times 0.5(0.5) \div 0.05^2$

n = 384.16

n will be 385 as a minimum sample size for this study.

Specific objective 3: Using Suresh & Chandreshakara (2012);

$$n = \frac{(1+r)^2\,[Z_\alpha + Z_\beta]^2}{r\,(lnOR)^2 x\, p(1-p)}$$

In a study in Mulago 2016(Nakimuli et al., 2013); thrombocytopenia in pregnant women with HTN in pregnancy OR=2.0 compared to pregnant women with HTN in pregnancy without thrombocytopenia; and the ratio, r, of women with HTN in pregnancy with thrombocytopenia =2.0; and proportion, p, thrombocytopenia in pregnancy among women with HTN in pregnancy 45. Taking α=0.05 & statistical power=80%; β=0.2; $Z_\alpha = 1.96$; $Z_\beta = 0.84$

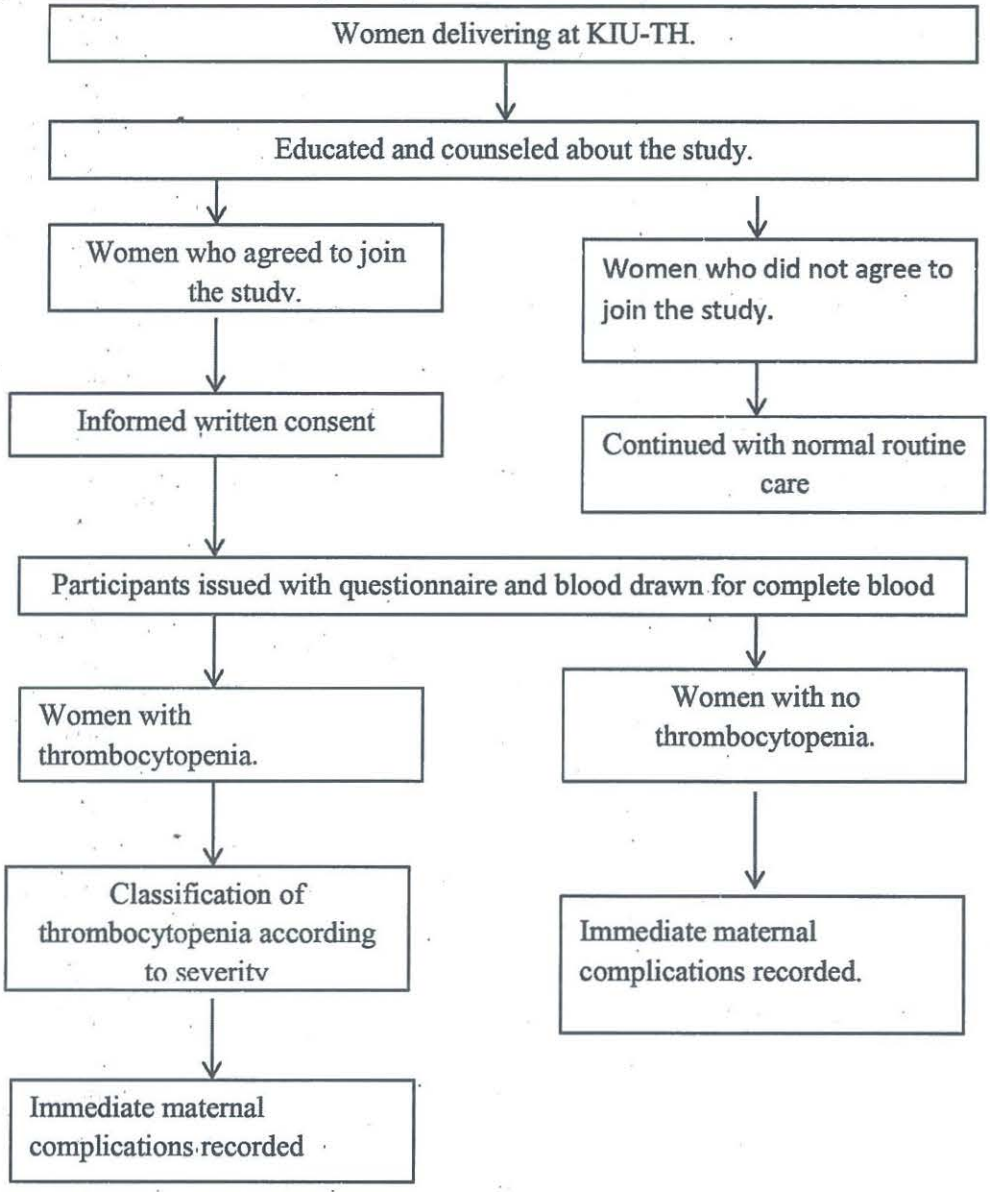
$$n = \frac{(1+2)^2\,[1.96 + 0.84]^2}{2\,(ln2.0)^2 x\, 0.45(1-0.45)}$$

n=297

3.6 Sampling technique

Consecutive sampling of selected study participants who met the inclusion criteria and consented to join the study was done until a sample of 386 participants was achieved.

Figure 2: Flow Chat for the participant recruitment and data collection



3.7 Data collection instruments

Structured investigator-administered pre-tested questionnaire was used for each participant to collect information on socio-demographic, medical and obstetric factors. Blood was collected for complete blood count to check platelets and haemoglobin levels.

3.8 Procedure

3.8.1 Counseling

Patients were counseled and educated about the study 24 hours after delivery. If the patients agreed to join the study, a written informed consent was signed.

3.8.2 Data collection procedure

3.8.2.1 History taking

History was taken from a patient in postnatal ward within 24 hour post-delivery, demographic data was obtained, and events during labour and mode of delivery were enquired.

3.8.2.2 Examination

General examination was done and vital signs were taken. A routine abdominal examination was done including vaginal examination to ensure that the woman was not bleeding. Once examination was done, the patient was counseled about the study. If the patient agreed to participate in the study, written consent was obtained; investigator administered questionnaire was issued and blood sample collected for complete blood count. Immediately after taking the blood sample, more information was obtained from the study participants' records the hospital file.

3.8.2.3 Sample collection

Blood was collected through venipuncture and put into a vacutainer containing an anticoagulant (Ethylenediaminetetraacetic acid) to avoid clotting. The blood sample was transported to the laboratory for complete blood count analysis. The phlebotomy site selected was either the antecubital fossa or forearm, where a vein of good size, visible, straight and clear was located. A tourniquet was applied about 4–5 finger widths above the venipuncture site and the vein was re-examined (WHO, 2013). While wearing clean gloves, the chosen site was swabbed with alcohol (70%) and allowed to dry completely. The vein was anchored by holding the patients arm and placing a thumb below the venipuncture site, phlebotomy was performed at approximately 30 degree angle and 4mls of blood was collected and put in a well labeled vacutainers which

contained ethylenediaminetetraacetic acid (WHO, 2013). Pressure was applied to the site until bleeding completely stopped. The puncture wound was then inspected and when haemostasis was achieved a bandage was applied and removed after one hour (WHO, 2013). The collected sample was taken immediately to the laboratory for complete blood count analysis.

3.9 Validity of data collection instruments

Data collection instrument was pretested in Fortportal Regional Referral hospital to identify possible sources of errors. Content validity index of more than the agreed 70% was established. This was achieved by giving questionnaire to 15 respondents who were not part of the study.

3.10 Reliability of data collection instruments

By using the Cronbach's coefficient alpha, a value of more than 0.8 was taken to indicate that items of the questionnaire were reproducible and consistent. Blood specimen for CBC was collected in the right quantity and placed in proper vacutainers which ensured reliability.

3.11 Sample processing and analysis

Automated haematology analyzer technology was used to analyze blood for complete blood count giving correct number of platelets. The haematological analyzer was well calibrated according to the acceptable international standards (NHANES, 2014).

3.12 Data analysis plan

Data on questionnaires was entered in Microsoft Excel version 2010, and after exported to STATA 14.1 (Statacorp, USA Texas). Socio-demographic, medical and obstetric factors were summarized as means, medians, standard deviations and interquartile range (for continuous variables). Proportions, percentages and frequencies were used for categorical variables using STATA 14.1.

Objective 1: Prevalence of thrombocytopenia in women delivering at KIU-TH was calculated with the number of women with thrombocytopenia as numerator and total number of participants being the denominator multiplied by 100. The severity of thrombocytopenia in women delivering at KIU-TH was summarized as percentages and presented in pie charts as mild, moderate and severe.

Objective 2: The proportion of mothers with the different immediate maternal complications were summarized and as percentages.

Objective 3: Social demographic, obstetrics and medical factors related with thrombocytopenia in women delivering at KIU-TH were analyzed by both bivariate and multivariate logistic regression analysis. After doing bivariate analysis, variables that were biologically plausible and those that had p-values < 0.05 were considered for multivariate analysis. The variables in the final multivariate model were significant when $p < 0.05$. The measure of association was reported as odds ratios (ORs) with corresponding 95%CI and p-value.

3.13 Feasibility of the study

KIU-TH had approximately 200 deliveries in a month. It had a fully equipped laboratory to handle required test in this research.

3.14 Quality control

An inclusion and exclusion criterion was strictly adhered to. A common pretested and pre-edited questionnaire was used. Each questionnaire was checked for completeness before collection of data which ensured valid data was obtained.

The blood sample was obtained in a sterile manner. The sample was handled by a qualified laboratory scientist under the guidance of a hematologist. The haematology analyzer machine is well calibrated according to Uganda National Health Laboratory Services. Samples were well labeled according to the numerical code of the participants for easy identification and follow up. To ensure quality control, 10% of the samples were analyzed at Lancet laboratory, a certified laboratory in Mbarara.

3.15 Ethical considerations

3.15.1 Informed consent and respect for participants

Voluntary recruitment was done and a written informed consent was obtained after fully explaining the details of the study to the study participant in English or local languages (copy attached at Appendices I, II and III). No participant was enrolled against their will. Participants were free to withdraw from the study at any time they wished without compromise of the care they were entitled to.

3.15.2 Risk and adverse event to study participants

Venipuncture for blood sample may lead to thrombophlebitis or excessive bleeding. The process of phlebotomy was done gently and professionally using a sterile technique as guided by World Health Organization. This minimized risk of pain and thrombophlebitis. After phlebotomy,

gentle pressure was applied at the venipuncture site which stopped bleeding. The volume of blood sample collected was also strictly adhered to. There were no other studies done using the participant's blood sample without obtaining fresh consent from the participants.

3.15.3 Benefits of the research

Study participants were educated about thrombocytopenia and its complications. The department of obstetrics and the hospital was enlightened on the prevalence of thrombocytopenia in pregnancy and its contribution to immediate maternal complications. The community was enlightened on the importance of regular screening for thrombocytopenia in antenatal clinic as a routine work up.

3.15.4 Privacy and confidentiality

Identification of participants was by means of numerical codes. Details of respondents were kept under lock and key for privacy and confidentiality purposes throughout the course of research. Respect of the respondents' rights and fair treatment was strictly adhered to thus minimizing harm and discomfort to them. There was no disclosure of participants' names to the public and all identities were removed from the results before presentation.

3.15.5 Sampling technique

Consecutive sampling method was used to select participants for the study. An eligibility criterion was strictly adhered to. There was no priority given to any tribe, race religion or status.

3.15.6 Incentives and reimbursement

No monetary or any other form of incentives was offered to the participants. However if any complications would have occurred as a result of the study, compensation and reimbursement would have been offered.

3.15.7 Approval procedure

Approval to carry out the study was sought from the department of Obstetrics and Gynaecology, KIU-TH hospital management, Faculty and Post-graduate directorate and finally the Kampala International University Research Ethics Committee (KIU-REC-UG-REC-023/201903). After approval by the KIU-REC, the study was registered with Uganda National Council for Science and Technology (UNCST) who permitted for the research to be done.

3.15.8 Respect for community and feedback

The procedures involved in this study were not against the local community beliefs, traditions and culture. Our study findings were communicated to the head of Obstetrics and Gynaecology department of Kampala International Hospital (KIU-TH) and were offered to Bushenyi-Ishaka Municipality Health office as a form of feedback.

3.16 Study limitation and delimitations

Placenta abruption and postpartum haemorrhage might influence the amount of platelets after delivery. However the prevalence of the old cases of thrombocytopenia in pregnancy will not be missed. Unconscious patients were not included in this study, thus some cases of thrombocytopenia might have been missed.

3.17 Dissemination plan

After the approval of the final report, the study findings were submitted to the Department of Obstetrics and Gynaecology, Faculty and Post-graduate Directorate. A bound copy of the findings was submitted to the university library, Post-graduate Directorate and District health officer of Bushenyi District. Publication through in a peer review journal will be done.

Chapter Four: Presentation and Interpretation of Results

4.1 Participants Characteristics

4.1.1 Social demographic characteristics of study participants

TABLE 1. Majority of the study participants were aged between 25 years and 35 years with a mean age of 28.2 years. The lower quartile was 22 years and upper quartile was 35 years. The majority of study participants were married, peasant farmers and belonged to the Banyankole tribe.

Table 1: Social demographic characteristics (N = 386)

VARIABLE	FREQUENCY (%)
Mean age in years (SD)	28.2 (7.3)
Age categories in years	
15-17	27 (6.99)
18-24	113 (29.27)
25-34	143 (37.05)
35-49	103 (26.08)
Tribe	
Munyankole	345 (89.38)
Muganda	22 (5)
Mukiga	12 (3.11)
Others	7 (1.81)
Occupation	
House wives	143(37.05)
Peasant farmers	182 (47.15)
Business women	45 (11.6)
Skilled workers	16 (4.15)
Married	
Married	376 (97.4)
Not married	10 (2.5)

4.1.2 Obstetrics and medical characteristic of study participants

TABLE 2. The majority, 42% of the study participants were grand multigravida and over 89% had a term pregnancy. A great number of the study participants, 99% had attended antenatal clinic (ANC) at least once, of these 10% were diagnosed with high blood pressure in current pregnancy, 21% had been diagnosed for anaemia in current pregnancy, 14.5 % had a history of antepartum haemorrhage in current pregnancy and only 15.8% had a history of postpartum haemorrhage after their previous deliveries.

Table 2: Obstetrics and medical characteristics (N = 386)

VARIABLE	FREQUENCY (%)
Gravidity	
1	94 (23.4)
2-4	130 (34)
≥5	162 (42.4)
Gestational age	
28-34	16 (4.15)
35-36	24 (6.22)
>37	346 (89.64
Attended ANC	
NO	3(0.78)
YES	383(99.22)
History of anterpartum haemorrhage in current pregnancy	
NO	330 (85.49)
YES	56 (14.51)
Treated for malaria in current pregnancy	
NO	360(93.26)
YES	26 (6.74)
Diagnosed with anaemia in current pregnancy	
NO	305 (79.02)
YES	81 (20.98)
History of postpartum haemorrhage in previous pregnancy	
NO	325 (84.2)
YES	61 (15.8)
History of easily bleeding	
NO	376 (97.4)
YES	10 (2.59)
History of multiple transfusion	
NO	361 (93.51)
YES	25 (6.49)

4.2 The overall prevalence, age specific prevalence and severity of thrombocytopenia among women who delivered at KIU-TH

Of the 386 mothers enrolled in the study, 61 (15.8%) had thrombocytopenia. Of these, as illustrated in figure 1, 34 (55.7%) had mild thrombocytopenia, 23 (37.7%) had moderate thrombocytopenia and 4 (6.6%) had severe thrombocytopenia. The prevalence of thrombocytopenia, varied significantly with maternal age category (P = 0.0329), as shown in figure 2 with mothers between 15-17 years having the highest prevalence.

Table 3: Overall prevalence and severity of thrombocytopenia among women who delivered at KIU-TH

VARIABLE	FREQUENCY (%)
Overall prevalence	61 (15.8%)
Severity of thrombocytopenia	
Mild thrombocytopenia	34 (55.7)
Moderate thrombocytopenia	23 (37.7)
Severe thrombocytopenia	4 (6.6)

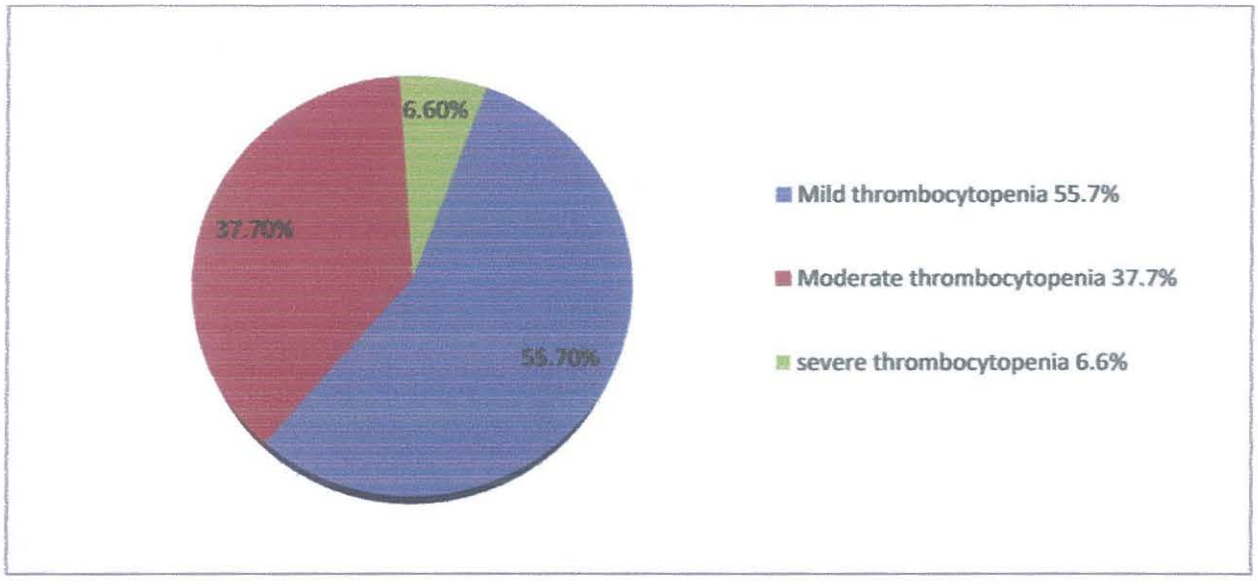


Figure 3: A pie chart showing the severity of thrombocytopenia in women delivering at KIU-TH

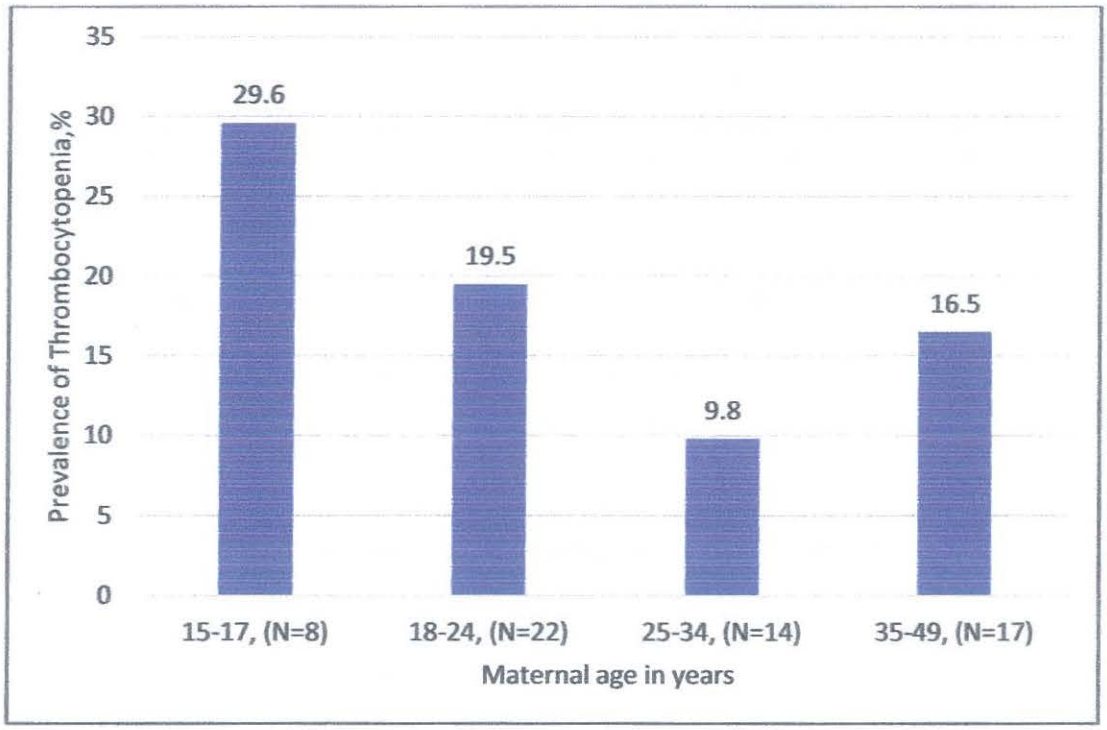


Figure 4: Prevalence of thrombocytopenia by maternal age categories

N: total number of mothers in a specific age category

4.3 The relationship between immediate maternal complications and thrombocytopenia among women delivering at KIU-TH

TABLE 4. The proportion of the study participants with placentae abruption was higher among women with thrombocytopenia, 44.3% as compared to those that no thrombocytopenia, 2.2%, this was statistically significant, $P < 0.001$. The proportion of the study participants who had postpartum haemorrhage was higher among the women with thrombocytopenia 45.9% compared to those that had normal platelets levels 6.8%; this was statistically significant $P < 0.001$. There was no statistical significance among women who had haematoma at episiotomy site, $P = 0.0499$ and haematoma at incision site, $P = 0.291$. There was no case of disseminated intravascular coagulation during the course of the study.

Table 4: Relationship between immediate maternal complications and thrombocytopenia among women delivering at KIU-TH

Immediate complication	Without thrombocytopenia	With thrombocytopenia	P -value
Abruption placenta			< 0.001
NO	318 (97.9)	34 (55.7)	
YES	7 (2.2)	27 (44.3)	
PPH			< 0.001
NO	303 (93.2)	33 (54.1)	
YES	22 (6.8)	28 (45.9)	
Haematoma at episiotomy site			0.499
NO	322 (99.08)	60 (98.32)	
YES	3 (0.92)	1 (1.64)	
Haematoma at incision site			0.299
NO	324 (99.69)	60 (98.32)	
YES	1 (0.31)	1 (1.64)	

4.4 Bivariate analysis of social demographic, obstetrics and medical factors associated with thrombocytopenia among women delivering at KIU-TH

TABLE 5. Bivariate analysis of factors associated with thrombocytopenia among women delivering at KIU-TH, showed that a decrease in age was associated with thrombocytopenia in pregnancy, women in age category 15-17 were approximately 4 times more likely to have thrombocytopenia in pregnancy compared to women in age category 25-35 years, this was statistically significant with a cOR = 3.9, 95%CI 1.22 - 8.47. Marital status also bared statistical significance as illustrated in the table below with women who were not married being 3.7 more likely to have thrombocytopenia in pregnancy compared to women who were married with cOR = 3.7, 95%CI 1.02 - 13.65.

Pregnant women who had hypertension in pregnancy were 16.5 times more likely to have thrombocytopenia compared to women who had no hypertension in pregnancy, this was statistically significant with cOR = 16.5. 95% CI 7.9 - 34.5. Women with a history of easily bleeding were 3.7 more likely to have thrombocytopenia compared to women without history of easily bleeding, this was statistically significant with cOR = 3.73, 95%CI 1.02 - 13.6. Study participant with a history of multiple blood transfusions was 3 times more likely to have

thrombocytopenia in pregnancy compared to women who had no history of multiple blood transfusions, this was statistically significant with cOR = 2.72, 95%CI 1.12 – 6.63.

Women with chronic illness were 4.6 times more likely to have thrombocytopenia compared to women without chronic illness, this was statistically significant with cOR = 4.55, 95% CI 1.98 – 10.46. Pregnant women who were HIV positive were 17.6 times more likely to have thrombocytopenia in pregnancy compared pregnant women who were HIV negative, this was statistically significant with cOR 17.6, 95%CI 5.3 – 57.4. Women who had a haemoglobin level below 11g/dl were 5.3 times more likely to have thrombocytopenia in pregnancy compared to women who had haemoglobin levels above 11g/dl, this was statistically significant with cOR 5.37, 95%CI 1.9 – 15.176.

Table 5: Bivariate analysis of social demographic, obstetrics and medical factors associated with thrombocytopenia among women delivering at KIU-TH

VARIABLE	PLT > 150,000/ml n=325 (%)	PLT < 150,000/ml n=61 (%)	cOR 95%CI	P. VALUE
Age categories				
15-17	19 (70.4)	8 (29.6)	3.9 (1.44 - 10.45)	0.007
18-24	91 (80.5)	22 (19.5)	2.2 (1.08 - 4.58)	0.030
25-34	129 (90.2)	14 (9.18)	1.0	
35-49	86 (83.5)	17 (16.5)	1.8 (0.85 - 3.89)	0.121
Marital status				
Married	319 (84.84)	57 (15.16)	1.0	
Not married	6 (60)	4 (40)	3.7 (1.02 – 13.64)	0.046
History of easily bleeding				
NO.	319 (84.84)	57 (15.16)	1.0	
YES	6 (60)	4 (40)	3.73 (1.02 – 13.60)	0.046
Multiple transfusion				
NO	307 (85.28)	53 (14.72)	1.0	
YES	17 (68)	8 (32)	3.73 (1.02 – 13.6)	0.046
History of chronic illness				
NO	320 (86.11)	50 (13.5)	1.0	
YES	5 (26.67)	11 (73.33)	2.72 (1.12 – 6.63)	0.027
HIV status				
NO	315 (86.11)	31 (13.9)	1.0	
YES	10 (25)	30 (75)	17.6 (5.3 – 57.4)	< 0.001
Diagnosed with HTN in pregnancy				
NO	311 (89.9)	35 (10.1)	1.0	
YES	14 (35)	26 (65)	16.5 (7.9 – 34.5)	< 0.001
HB levels				
> 11g/dl	297 (87.43)	43 (12.65)	1.0	
< 11g/dl	28 (60.87)	18 (39.13)	5.3 (1.9 – 15.176)	0.002

4.5 Multivariate analysis of social demographic, obstetrics and medical factors associated with thrombocytopenia among women delivering at KIU-TH

TABLE 6. Upon multivariate analysis the odds of having thrombocytopenia was 4.3 times higher among mothers age 15-17 years as compared to those age 25-35 years; (aOR: 4.3, 95%CI: 1.17 – 15,94) and this was statistically significant, P = 0.028. Women age category 18-24 were 2.9 times more likely to have thrombocytopenia compared to women age 25-34; (aOR: 2.9, 95%CI: 1.19 – 7.31), this was statistically significant with P = 0.02.

The odds of having thrombocytopenia was 18.9 times higher among women diagnosed with hypertension in pregnancy compared to those that did not have hypertension in pregnancy; (aOR: 18.9, 95%CI: 8.18 – 43.13) and this was statistically significant with P < 0.001.

Women who were HIV positive were 21.2 more times likely to have thrombocytopenia compared to women who were HIV negative; (aOR: 21.2, 95%CI 5.15 – 87.56), this was statistically significant with P < 0.001. The odds of having thrombocytopenia was 4.48 higher among women with haemoglobin below 11g/dl compared to those who had haemoglobin above 11g/dl; (aOR: 4.48, 95%CI: 1.3 – 15.5), this was statistically significant with P = 0.018.

Table 6: Multivariate analysis of social demographic, obstetrics and medical factors associated with thrombocytopenia among women delivering at KIU-TH

VARIABLE	ADJUSTED OR 95% CI	P. VALUE
Age category		
15-17	4.3 (1.17 – 15.94)	0.028
18-24	2.9 (1.19 – 7.31)	0.020
25-34	1.0	
35-49	2.1 (0.84 – 5.45)	0.110
HTN in pregnancy		
NO	1.0	
YES	18.9 (8.18 – 43.13)	< 0.001
HIV POSITIVE		
NO	1.0	
YES	21.24 (5.15 – 87.56)	< 0.001
HB levels		
>11g/dl	1.0	
<11g/dl	4.48 (1.3 – 15.5)	0.018

CHAPTER FIVE: Discussion, Conclusions and Recommendations

5.0 Introduction

Maternal mortality and morbidity in Sub-Saharan Africa is higher than most of the world (WHO, 2015). Research aiding in reduction of maternal mortality and morbidity is thus paramount. This chapter presents a discussion on the key findings from this research. Generally, the findings depict the presence of thrombocytopenia in women delivering at KIU-TH and its contribution to immediate maternal complication.

5.1 Discussion

5.1.1 The prevalence of thrombocytopenia among women delivering at KIU-TH

The prevalence of thrombocytopenia in pregnancy in this study was 15.8%. This was relatively higher than the global prevalence of thrombocytopenia in pregnancy which is 10% (Stasi et al., 2011). The variation could be due to contribution of thrombocytopenia in pregnancy by hypertension diseases in pregnancy and HIV infection in pregnancy in this study. The study findings were also relatively higher than a study done in King George medical university in India, which had a prevalence of 8.8% (Nisha et al., 2012). This would be attributed by the higher prevalence of HIV infection in pregnancy in my study and its contribution to thrombocytopenia in pregnancy. In Canada the prevalence of thrombocytopenia was 7.6%, this was lower than the prevalence in this study (Natu et al., 2017). This was attributed by good follow up in prenatal clinic, with treatment of most medical disorders that contributed to thrombocytopenia in pregnancy before the woman conceives (Natu et al., 2017).

This study findings were also relatively higher than a study done in northern Ethiopia, which had a prevalence of 8.8% (Asrie et al., 2017). Despite both studies having almost similar social demographic and obstetrics characteristics the difference would have been attributed by a smaller sample size of 217, in the study done in northern Ethiopia. The prevalence of this study was relatively similar to a study done in Ghana, which had a prevalence of 15.3% (Edeghonghon et al., 2012). This was attributed by the similar social demographics and obstetrics characteristics.

On severity of thrombocytopenia, majority of the study participants had mild thrombocytopenia 55.7%, followed by moderate thrombocytopenia 37.7% then severe thrombocytopenia 6.6%. This is similar to studies done in India, Ghana and Ethiopia which showed a high frequency of mild thrombocytopenia followed by moderate thrombocytopenia and the minimum frequency with severe thrombocytopenia (Asrie et al., 2017; Edeghonghon et al,. 2012; Nisha et al., 2012).

The postulated major cause of thrombocytopenia in pregnancy is gestational thrombocytopenia which rarely goes below 70, 000/µl, thus the consistency in severity of thrombocytopenia among different studies (Rajasekhar et al., 2013).

5.1.2 The relationship between immediate maternal complications and thrombocytopenia among women delivering at KIU-TH

This study showed significant contribution of thrombocytopenia to postpartum haemorrhage. The proportion of the study participants who had postpartum haemorrhage was higher among women with thrombocytopenia, 45.9% compared with those that had normal platelets levels; this was statistically significant with $P < 0.001$. This was similar to a study done in India which conferred that the proportion of women who had postpartum haemorrhage was 35% higher among women with thrombocytopenia than women with no thrombocytopenia, this was statistically significant in there study with a $P < 0.001$ (Nisha et al., 2012). Additionally, the proportion of women with postpartum haemorrhage among thrombocytopenia was slightly higher, 3.5% compared to women with no thrombocytopenia in a study done in Hakeem Abdul Centenary hospital in India (Zutshi & Arora, 2019). This variation in the latter study could be because their study included only women with gestational thrombocytopenia. Conversely, a study done in Croatia showed no association between thrombocytopenia and postpartum haemorrhage, this was statistically significant in their study; $P = 0.004$. This variation could be explained by the fact that the Croatia study included only women with gestational thrombocytopenia which seldom causes complications (Natu et al., 2017).

This study also showed a significant contribution of thrombocytopenia to placentae abruption. The proportion of the study participants who had placenta abruption was significantly higher among women with thrombocytopenia (44.3%) as compared to those that had no thrombocytopenia (2.2%); $P < 0.001$. This was similar to a study done by Vishwekar and colleagues, which had a higher proportion of placenta abruption among women with thrombocytopenia compared to those without thrombocytopenia (Vishwekar et al., 2017). This study was also relatively similar with a study done by Zutshi and colleagues in India, where the propotion of women with placenta abruption was 2.5 times higher among women with thrombocytopenia compared to women with no thrombocytopenia (Zutshi & Arora, 2019). Their study however enrolled only women with gestational thrombocytopenia hence the slight variation (Natu et al., 2017). Conversely, a study done by Nisha and colleagues, showed equal

proportion in incidence of placenta abruption between women who had thrombocytopenia and women without thrombocytopenia (Nisha et al., 2012).

5.1.3 Social demographic, obstetrics and medical factors associated with thrombocytopenia among women delivering at KIU-TH

5.3.3.1 Age

In this study the odds of having thrombocytopenia was higher in women who were below 25 years compared to women age 25 years and above. This could be contributed by the fact that majority of the women below 25 years were primigravida, who were more susceptible to malaria in pregnancy, folic acid deficiency and gestational thrombocytopenia, attributing them to higher odds of having thrombocytopenia (Wang et al., 2017). Also, Bushenyi district has a high rate of malnutrition which may contribute to thrombocytopenia in teenage mothers via iron and folic acid deficiencies (UBOS, 2014). This was similar to studies done in India and Ethiopia which had higher incidence of thrombocytopenia among women 24 years and below (Asrie et al., 2017; Nisha et al., 2012; Rajasekhar et al., 2013). This would have been contributed by the fact that majority of their study participants in this age group were primigravida. This deferred with a study done by Parnas and colleagues which had a higher percentage of women with thrombocytopenia among age 35 and above (Parnas et al., 2006). This could have been contributed by a high pregnancy induced hypertension in his study which was more common in this age group.

5.3.3.2 Hypertension in pregnancy

Women who had hypertension in pregnancy were more likely to get thrombocytopenia than women who did not have hypertension in pregnancy. This is because pregnancy induced hypertension, a subset of hypertension diseases in pregnancy, is known to cause thrombocytopenia as part of the course of the disease which cause accelerated platelet destruction and abnormal platelet activation (Sultana et al., 2012). This was similar to studies done in India and China which had a significant association between hypertension in pregnancy and thrombocytopenia (Nisha et al., 2012; Wang et al., 2017). This was also similar to a study done in Libya which showed a high association between hypertension disease in pregnancy and thrombocytopenia (Muspah & Altayri, 2017).

5.3.3.4 HIV

HIV infection was strongly associated with thrombocytopenia in this study. This could be due to the contribution of HIV infection to causing thrombocytopenia as a result of platelets involvement in immune response, cytopathic effect of antiretroviral regimens and antigen mimicry (Taremwa et al,. 2015). This was similar to a study done in Libya and South Africa which showed a significant association between HIV and thrombocytopenia (Muspah & Altayri, 2017; Sebitloane, 2016). The strong association was as a result of the course of the HIV virus infection especially to the women who were not an antiretroviral (Sebitloane et al., 2016) . HIV virus is known to cause chronic thrombocytopenia due to accelerated peripheral platelets destruction and ineffective production of platelets from infected megakaryocytes and increased catecholamine's reducing bone marrow cell proliferation (Taremwa et al., 2015). Conversely in a study done in China, they showed no association of HIV infection with thrombocytopenia (Wang et al., 2017). This would have been because of a relatively low prevalence of HIV in pregnancy in China and good care on HIV infected mothers including home follow up (Gong et al., 2018).

5.3.3.5 Anaemia

Anaemia in pregnancy was strongly associated with thrombocytopenia in this study. Recurrent thrombocytopenia has been documented in iron deficiency anaemia which is common in pregnancy (Torrejon, Calvo & Stella, 2018). Postulated theory on the cause of thrombocytopenia in iron deficiency anaemia is the diphasic response of the platelets to erythropoietin and the dual function of iron in platelets production, iron is required for the production of integral portion of the platelet (Torrejon, Calvo & Stella., 2018). This was similar to a study done in Cameroon which had a strong association of anaemia with thrombocytopenia (Takoeta, 2007). A prospective cohort study done in Libya also showed strong association of thrombocytopenia, women with severe anaemia had higher odds of having thrombocytopenia than women who had mild anaemia (Muspah & Altayri, 2017).

5.2 Strength and weakness of the study

5.2.1 Strength of the study

This study is among the first to be carried out in Western Uganda and so our key findings will give important information on thrombocytopenia in pregnant women. In addition, this study compares immediate complications between mothers delivering without thrombocytopenia and thrombocytopenia making the study more scientific valid.

5.2.2 Weakness of the study

This study did not include specific causes of thrombocytopenia in pregnancy in this community which might be diverse.

5.3 Conclusion

- This study revealed that the prevalence of thrombocytopenia among women delivering at KIU-TH is high.
- The proportion of women with immediate maternal complication was higher in women with thrombocytopenia than women who did not have thrombocytopenia.
- Hypertension in pregnancy, pregnant women 25 years and below, HIV positive and anaemia in pregnancy were the major factors associated with thrombocytopenia in women delivering at KIU-TH.

5.4 Recommendation

- Early screening and treatment of thrombocytopenia in pregnancy during antenatal visits to avoid complication in labour and after delivery.
- Mothers in labour or anticipating delivery should be screened for thrombocytopenia for close monitoring in mothers who have thrombocytopenia in anticipation for immediate maternal complications.
- Mothers, who are HIV positive, pregnant women 25 years and below, have hypertension diseases in pregnancy and have anaemia in pregnancy should be screened for thrombocytopenia in pregnancy.

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APPENDIX I: Informed Consent Form

KAMPALA INTERNATIONAL UNIVERSITY (KIU) WESTERN CAMPUS (WC)
RESEARCH ETHICS COMMITTEE (REC)

PO Box 71, Bushenyi, Uganda; Tel: +256 758 096 775
E-mail: kiurec2017@kiu.ac.ug; Website: www.kiu.ac.ug

Study Title "**Prevalence, Immediate Maternal Complications and Factors Associated with Thrombocytopenia among Women Delivering at Kampala International University Teaching Hospital Western Uganda**"

Principal Investigator(s): Dr David. Ruiru Gichungu

Qualifications: Bachelor of Medicine and Bachelor of Surgery (KIU-TH).

INTRODUCTION

What you should know about this study:

- You are being asked to join a research study.
- This consent form explains the research study and your part in the study
- Please read it carefully and take as much time as you necd
- You are a volunteer. You can choose not to take part and if you join, you may quit at any time. You will not lose any benefits you are entitled to if you do not want to participate or if you decide to withdraw in the middle of the study.

For REC Office only:	**For REC Office use only:**
NAME OF REC CHAIR: Dr. Patrick Mbyemeire TELEPHONE: +256 772601482 KIU REC STAMP:	APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

VERSION: THREE

Brief background to the study

The purpose of this study is to assess the" prevalence, immediate maternal complications and factors associated with thrombocytopenia among women delivering at KIU-TH". If you agree to be in this study, I will conduct an interview with you.

The interview will include questions about your socio-demographics, medical and obstetric factors. The interview will take about 10 minutes to complete. With your permission, I will take a blood sample from you and take it to the laboratory to see the blood cell levels.

Purpose of the research project

I do not anticipate any risks to you participating in this study other than those encountered in routine medical examination. There are benefits to you as it helps us manage you better, and also information gathered through your participation may lead to improvement in policy for the promotion of health in this country.

Why you are being asked to participate.

You have been recruited to participate because you fulfill the inclusion criteria in this study. All women that have the criteria for inclusion have been given an equal chance to participate in the study.

Procedures:

Patients who meet the inclusion criteria will be explained to what the study is about; benefits, confidentiality and autonomy will be allowed. Patient consent will be requested from each participant and if granted, blood for hematologic testing will be collected into an anticoagulant, Ethylenediaminetetraacetic acid (purple top tube) and analyzed for complete blood count. Sterility when collection the sample will be observed. The sample will be taken to the laboratory immediately.

For REC Office only:	**For REC Office use only:**
NAME OF REC CHAIR: Dr. Patrick Mbyemeire TELEPHONE: +256 772601482 KIU REC STAMP:	APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

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Discomforts

Mild pain may be felt by the participant during the phlebotomy process blood. Sterility will be observed during the process of drawing blood. Pressure at the phlebotomy site will be applied to avoid bleeding.

Benefits

Participant will be educated on what is thrombocytopenia and importance of screening during pregnancy. Any participant diagnosed with moderate and sever thrombocytopenia will be recommended for treatment.

Incentives / rewards for participating

No payment shall be made to you for purposes of participation in this study. Any appreciation given to you in any form should not be considered as part of the research protocol.

Protecting data confidentiality

You are assured that any information given will not be linked to you directly and your personal details will not be shared with any person. These results shall not be disclosed to anyone without the consent of the research participant.

Protecting subject privacy during data collection

Data shall be obtained from an enclosed place in the maternity first stage labor ward.

Right to refuse / withdraw:

Your participation in the study is purely voluntary, and refusal to participate will involve no loss of benefits that you are entitled.

For REC Office only:	**For REC Office use only:**
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What happens if you leave the study?

You are invited to participate in the study. Note that it is your right to accept or to decline and that your refusal shall not interfere with the services provided to you at Kampala International Teaching and referral hospital..

Who do I ask/call if I have questions or a problem?

You may reach the principle investigator through the following contacts:

Principal Investigator Mobile Number Tel: +256-705-960-370

KIU-TH Research Ethics Committee Tel: +256-758-096-775

What does your signature (or thumbprint/mark) on this consent form mean?

Your signature on this form means

- You have been informed about this study's purpose, procedures, possible benefits and risks.
- You have been given the chance to ask questions before you sign.
- You have voluntarily agreed to be in this study.

Print name of adult Participant	Signature or thumb print of adult participant	Date
Print name of person obtaining Consent (Researcher)	Signature	Date
Full names of witness	Signature or thumb print of witness	Date

For REC Office only: NAME OF REC CHAIR: Dr. Patrick Mbyemeire TELEPHONE: +256 772601482 KIU REC STAMP:	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

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APPENDIX II: Translated Informed Consent Form

KAMPALA INTERNATIONAL UNIVERSITY (KIU) WESTERN CAMPUS (WC)
RESEARCH ETHICS COMMITTEE (REC)
PO Box 71, Bushenyi, Uganda; Tel: +256 758 096 775
E-mail: kiurec2017@kiu.ac.ug; Website: www.kiu.ac.ug

EKIHANDIIKO KY'OKUHAMYA OKWIKIRIZANA AHA KWEGAITA OMUKUCONDOOZA

OMUTWE GW'OKUCONDOOZA: Obwingi, ebirikuruga hamwe nan'ebyakubaasa kuretera okukyendera kw'obutafari bw'eshegama omumibiri ahabakazi abarikuzarira omu irwariro erya itendekyero erikuru erya KIU-TH aheitagi erya burengyerwa eizooba bwa Uganda omuri ishaka.

Mukuru w'okucondooza: Dokita David Ruiru Gichungu

Obwegyese: Diguri y'ebyobushaho n'okushemeza okuruga omwitendekyero erikuru erya Kampala Intanasonolo. Kandi hati nashoma Diguri ya kabiri ey'ebyobushaho n'okuzaarisa ah'eitendekyero rikuru erya KIU-TH

OKWANJURA/OMUTWE GW'OKUCONDOOZA

Eby'oshemereire kumanya aha kucondooza oku

- Noshabwa kwetaba omu kucondooza oku
- Ekihandiko eki nikishoboorora aha kucondooza kwitu hamwe nan'obuhabuzi bwaawe ahamushomo ogu.
- Noshabwa okukishoma okakyetegyereza kurungi orikukozesa obwire bwoona obu orikenda.
- Ori omuyambi omumushomo ogu. Nobaasa kusharamu obuteetaba omukukucondooza oku Kandi watwegeitaho, noyikirizibwa kuruga omukukyondoza oku ohorikwendera otaferirwe kintu kyoona.

• **For REC Office only:** • NAME OF REC CHAIR: Dr. Patrick Mbyemeire • • TELEPHONE: +256 772601482 •	**For REC Office use only:** APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

• KIU REC STAMP:	

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Ebikwatireine n'okucondooza oku

Omugasho gw'okucondooza oku ni okwenda kumanya ebirikuruga hamwe nan'ebyakubaasa kuretera okukyendera kw'obutafari bw'eshagama omumubiri ahabakazi abenda abarikuzarira omu irwariro erya itendekyero erikuru erya Kampala Intanasonolo aheitagi erya burengyerwa eizooba bwa Uganda omuri ishaka. Ku orayikirize kwetaba omukucondooza oku, ninyiza kukubuuza ebibuuzo ibikwatirine na'nokucondooza oku.

Ebibuuzo ebirabuzibwe bikwatirine nana enshonga ez'obutuuze, enshonga ez'okuraguza narishi enshonga ez'okureterwa omukuzarisa. Okubuzibwa nikuza kutwara edakika ikumi (10) zonka. Oruhusa rwawe nirwo rwonka orurikunyikiriza kukwiha amatondo geshagama agaratwarwe omu labaratore okwenda kumanya embeera z'obutafaari bweshagama yawe.

Ekigyendererwa narishi omugasho gw'okucondooza oku

Tindikurebaho kizibu kyona ekyakubasha kukuteganisa wayetaba omukucondooza oku okwihaho obuzibu bukye obwakubasa kureterwa omukujanjabwa. Hariho ekikuwakubasa kufuna omukucondooza oku ahabwokuba nikuyamba ahakucondooza ahakubagye kwamagara gawe kandi ebirarugye omukucondooza nibizakuyamba omukutunguura ahabikwatirine nebyamagara omwihanga.

Ahabwenkyi orikuhabwa kwetaba omu'mushomo ogu?

Otoreinwe kwejumba omu kucondooza oku ahabwokuba oine ebisanizo ebirikwetagisa. Abakazi boona abaine ebirikwetagisa omukucondooza bahairwe akagisa akarikwingana kwetaba omukucondooza.

For REC Office only:	For REC Office use only:
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Engyendererwaho:

Bamwe ahabarwaire abaine ebyetaago/ebisanizo nibeija kushobororerwa ahabikwatirine nan'okucondooza oku, ebi okucondooza kurayamba, ebigyendererwaho omukucondooza kandi hamwe nanokwemaririra nikwijakwikirizibwa omukucondooza oku. Okwikirizana kurabaho ahagati yabarwaire abaratoranwe kandi oruhusa kukurahebwe kuruga omubarwaire, amatondo g'esagama garatwarwa kukyeberwa kandi eshagama eteebwe omubyooma ebyakubasa kugirindagye obutakwatana nabwanyima eshagama ekyondozibwegye kwenda kufuna obuhame burungi. Ahonaho, eshagama eratwaarwa omu labaratore.

Ebyaakubasa kukwerarikiriza omukucondoza oku

Obusasi bukye munonga nibubasa kuhurirwa ahashaha y'okukwihaho eshagama. Eby'obuyonjo nibuza kukuratirwa babanibihamu eshagama. Amani kukozesibwa ahmisi eracumitwe okwerinda obutajwa eshagama.

Ebi okucondooza oku kurayambe:

Abarayetabe omukucondooza oku nibaza kushomesibwa ahabikwatirine nan'okukyendera kw'obutafari bw'eshegama omumibiri hamwe nan'omugasho gwokukyebera omubwire bwokuzaara. Omuntu weena arayetabe omukucondooza oku kandi akashangwa aine oburwaire obu nobubwakuba bukye munonga, naija kuheebwa amagyezi gokuza ahabuzanjabi.

Ebiraakuheebwe ahabwokwetaba omu kucondooza oku:

Tihariho bicoonco byoona nka sente ebiriije kukuheebwa ahabwokwetaba omukucondooza.

Okubiika ebihama:

Nomanyisibwa ngu ebiraheebweyo omukucondooza tibirabe biine akakwate kahango munonga ahariwe kandi ebikukwatsireho munonga tibirayorekwe omuntu weena Atari mucondooza weitu omukuru. Ebirarugye omukucondooza tibirayorekwe omuntu weena kureka twebanza kwebuza aharimukama wabyo.

For REC Office only:	For REC Office use only:
NAME OF REC CHAIR: Dr. Patrick Mbyemeire TELEPHONE: +256 772601482 KIU REC STAMP:	APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

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Okwehereera omu bwiire bw'okugarukamu ebibuuzo

Eby'okubuzibwa nibyija kukorerwa omumwanya gw'ekihama kandi ogukingire omukishengye ekya hooda y'okubanza eya mateneti.

Obugabe bwokwanga nainga okuruga omukucondooza

Okwegaita omukucondooza oku n'ekyokweshariramu kandi okwanga nainga kurugamu tihariho ekirikubaasa kukuzibira kandi tihariho ekirihindura aha muringo ogw'oshemereire kuba nojanjabwamu.

Nihabahoki nasharamu kuruga omukucondooza oku?

Noshabwa kwetaba omukucondooza oku. Nomanyisibwa ngu noyikirizibwa okwanga kwetaba omukucondooza oku kandi okwanga kwawe tikwine kukirihindura aha bintu ebiwaba noza kufuna omu irwariro rya Kampala Intanasonolo erya burengyerweizooba.

Nimbuuza oha nainga ninyeta oha naaba nyine ekibuuzo nainga okuteganisibwa?

Nobaasa kugambira orikwebembera okucondooza oku aha simu namba 0705-960-370 nainga orikukurira akakiiko akarikureeberera eby'okucondooza ah'eitendekyero erikuru erya Kampala Intanashonolo, erya burengyrweizooba, aha namba y'esimu: 0758-096-775

For REC Office only: NAME OF REC CHAIR: Dr. Patrick Mbyemeire TELEPHONE: +256 772601482 KIU REC STAMP:	For REC Office use only: APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

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Okuta omukono gwawe nainga ekinkumu kyawe aha kihandiiko eki nikimanyisaki?

Omukono gwawenaing ekinkumu aha kihandiiko eki nikimanyisa ngu:

- Omanyisibwe aha bigyendererwa by'okucondooza oku, emitwarize, ebirungi hamwe n'akabi ebirikubaasa kurugamu kand washoborokyerwa kurungi
- Oheirwe omugisha kubuuza ebibuuzo kandi washoborokyerwa buri kimwe otakateireho omukono gwawe nainga ekinkumu
- Oikiriize oyekundiire, hatariho kugyemwa kwoona, kuza omukucondooza oku.

Eizina ryaawe	Omukono/Ekinkumu kyawe	Ebiro by'okwezi
Eiziina ry'orikurira okucondooza	Omukono	Ebiro by'okwezi
Eiziina ry'owaba ariho nk'omujurizi	Omukono/ekinkumu ky'omujurizi	Ebiro by'okwezi

For REC Office only: NAME OF REC CHAIR: Dr. Patrick Mbyemeire TELEPHONE: +256 772601482 KIU REC STAMP:	For REC Office use only: APPROVAL DATE: APPROVED CONSENT REC VERSION NUMBER: PI's NAME: REC NO:

VERSION: THREE

APPENDIX III: Investigator administered questionairre

Kindly respond to the following questions at will and should you feel any discomfort, you are free to discontinue from the study or leave the question blank.

Participant serial number	
Individual Factors(health, social and demographic)	
Q1	Age in years'……
Q2	Tribe ……
Q3	Marital status……
Q4	Address ……
Q5	Gravidity ……
Q6	Gestation age……
Q7	Occupation ……
	Obstetrics factors
Q8	Have had bleeding episodes in current pregnancy from 28 weeks gestation: 0 No [ ] 1 yes[ ]
Q9	Have you been treated for Malaria in current pregnancy? 0 No [ ] 1 yes[ ]
Q10	What is your HIV status ? 0 pos [ ] 1 neg[ ]
Q11	Have you been diagnosed with anemia in this pregnancy?
Q12	Have you had episodes of excessive bleeding after giving birth in previous pregnancy : 0 No [ ] 1 yes[ ]
Q13	Have you been diagnosed with high blood pressure in this pregnancy ……
	Medical factors
Q14	Do you have episode of easy bleeding like nose bleeding , bleeding while brushing your teeth No [ ] 1 yes[ ]
Q15	Have you been transfused blood many times on different occasions (multiple transfusion) No [ ] 1 yes[ ]
Q16	Do you have any chronic illness No [ ] 1 yes[ ]
Q17	If you have chronic illness what medicine are you taking ……
Q18	Do you use of recreational drugs in this pregnancy (if yes state which recreational drugs you use) ……
Q 19	Have you attended ANC how many visits

Q 20	Mode of delivery
Q 21	Complete blood count ;- (1) Platelet count..... (2) Hemoglobin levels .....
Q 22	Immediate maternal complications;- During labor :- (a) Abruption placentae After delivery;- (a) PPH (b) Hematoma at episiotomy site (c) Hematoma at incision site (d) DIC

APPENDIX IV: Translated investigator administered questionairre

Noshabwa kugarukamu ebibuuzo ebyayorekwa ahaifo oyekundeire kandi wahurira kitakushemeza, nobasha kurekyera ahorayendera narishi ekibuuzo otakigarukemu.

Individual Factors(health, social and demographic)	
Q1	Emyaka: .....
Q2	Oruganda/ Orurimi .....
Q3	Ebyobushwere.....
Q4	Ahorikuruga .....
Q5	Amazaara.....
Q6	Gestation age.....
Q7	Omurimo gworikukora .....
	Enshonga ezirikwatirine nan'okuzarisa
Q8	Haine okujwa kwona kwenda eyoyine obwahati okwabireho bwanyima y'esande 28y'orugire omumicwe? 0 Apana [ ] 1 Ego[ ]
Q9	Okararwaireho omuswaija kuruga otunga enda egi? 0 Apana [ ] 1 Ego[ ]
Q10	Oyine endwara y'akakooko kasirimu? : 0 Apana [ ] 1 Ego[ ]
Q11	Kwiha ofuna enda, orakyendirweho eshagama? 0 Apana [ ] 1 Ego[ ]
Q12	Okajwa munonga bwanyima y'okuzaara enda eyahwaire? 0 Apana [ ] 1 Ego[ ]
Q13	Okaba wazanzabirweho okweyongyera kweshagama narishi presa omumubiri ahanda eyoherurukire kuzaara
	Enshonga ezikwatirine nebyobushaho
Q14	Orajwireho eshagama nka omunyindo ningashi waba noyeza amaino .....
Q15	Barakuhindurire eshagama narishi okukutamu eshagama emirundi nyingi .....
Q16	Nokira kufuna endwara ezitarikukira.....
Q17	Ku orabe oyine endwara ezitarikukira, nokozesa mibazi ki.....
Q18	Haine ebitokoza bwongo nka amarwa nebindi ebi orikukozesa (Kukirabe kiri ngu ego nibitokoza bwongoki ebi orikukozesa).....
Q19	Nokira kwija kukyebeza enda ..... Okaija emirundi engahi.....
Q20	Omuringo gworikuzaara (bakakushemeza narishi?).....
Q21	Orwingano rwabasirikare beshagama;-

	(1) oku eshagama yawe erikujwa..... (2) Oku orikwitsya .....
Q22	Ebyabaireho;- Omukuzaara:- (a) Okwahukana kwa nyinenda nanekyanyima Bwanyimayokuzaara (a) Okujwa eshagama (b) Okushara obukazi (c) Okushemezibwa wazakuzaara (d) DIC